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PREGNANCY TESTS

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Of recent years there have been great improvements in the clinical methods of diagnosing early pregnancy in the domestic animals. These methods are now well known, having been the subject, from time to time, of discussion in *The Veterinary Record*. They have also recently been concisely described by Benesch and Wright (1950) and the pertinent literature was reviewed by Cowie in 1948. Occasions arise, however, when the veterinarian deems it desirable to seek confirmation of his diagnosis and when he must consider what laboratory or other tests are available for the purpose. In the last two decades much research has been devoted to the study of tests for pregnancy in women and in animals. Despite, or perhaps because of, the numerous papers on this subject, there exists some confusion as to what tests are applicable to the various domestic animals.

Tests for pregnancy are not a modern innovation. References are to be found in some of the earliest historical records in existence which show that "tests" for pregnancy were in use in ancient Egypt. Bayon (1939) has shown that modifications and variations of these "tests" reappear in later civilizations and he considers it probable that some at least were handed down from Egyptian to Hellenic medicine, thence to reappear in mediaeval medical and quasi-medical literature, and perhaps even to linger on in current folklore. While these tests now appear crude and interwoven with the practices of magic and witchcraft, and while the majority of them may be dismissed as being founded on superstition and quackery, there is at least one type which cannot be set aside so lightly. Tests based on the effect of the urine of pregnant women on growing seedlings or plants are mentioned in at least two ancient Egyptian papyri and references to similar tests have appeared in the intervening three or four thousand years, the most recent of these being reports by Orban in 1947 that pregnancy urine of women had a characteristic effect on the bud growth and flowering of gladioli, and by Novazzi in 1950 that the serum of pregnant mares had a specific effect on the growth of white lupin seedlings. Both authors claim a high percentage of correct results with these tests.

Modern research has shown that the hormones present in human pregnancy urine can influence plant growth and the above-mentioned tests may legitimately be described as hormonal tests. The first really accurate and specific hormonal test for pregnancy, however, was that developed by Aschheim and Zondek in 1927. This test is based on the presence in the urine during early pregnancy of large quantities of gonadotrophin of placental origin which can readily be detected by its effects on the gonads of test animals. Over the last 20 years many modifications of this method have been introduced with the intention of simplifying and speeding up the reading of the test so that an answer may be obtained in a few hours instead of four days. The accuracy of the original Aschheim-Zondek test, however, has never been surpassed and indeed not always equalled.

Tests based on other hormones have been developed and modern hormonal tests may now be classified as (*a*) gonadotrophin tests, (*b*) oestrogen tests, and (*c*) pregnanediol tests (pregnanediol is a metabolic product of progesterone).

Gonadotrophin Tests.—To detect gonadotrophic hormones it is necessary to use biological methods and, moreover, in view of the complex protein nature of these hormones it is unlikely that any specific chemical tests will be available at least for some years to come. The better-known tests of this class are the original Aschheim-Zondek test in which ovarian changes in immature mice are used in reading the test; the Friedman, Schneider, or Brouha test in which ovarian changes in the rabbit are employed; and the Xenopus test, in which oviposition in the female *Xenopus laevis* "toad" indicates the presence of gonadotrophin in the injected urine. In the last three years a test developed by Galli Mainini has attracted much attention. This depends on the appearance of spermatozoa in the cloacal fluid of the male toad or frog within an hour or two of the injection of gonadotrophin.

Oestrogen Tests.—During pregnancy large quantities of oestrogen are excreted in the urine of the pregnant woman. This hormone can be detected readily by injection of urine into ovariectomized rodents when the vaginal smear will take on oestrous characteristics. In the woman, oestrogen tests are less reliable for the diagnosis of pregnancy than the gonadotrophin tests and therefore are rarely used. Oestrogen tests are, as will be seen later, of value in the mare where both biological and chemical methods may be used to detect the oestrogen.

Pregnanediol Tests.—Pregnanediol is a steroid—derived at least in part from the metabolism of progesterone—excreted in increasing amounts during pregnancy in women. Being almost inactive biologically, pregnanediol must be determined chemically. There are several well-known methods of assay, such as the Venning-Browne, the Astwood-Jones, and the Guterman techniques, as well as a method recently introduced by Marrian and his co-workers. Pregnanediol tests are not as reliable as gonadotrophin tests.

The above-mentioned hormonal tests have all been developed for detecting pregnancy in the woman, and in view of the species differences in the hormonal patterns during pregnancy it is necessary to consider the applicability of these tests to the individual domestic animals. So far as pregnanediol is concerned the domestic animals do not excrete significant quantities of this steroid during pregnancy and this type of test need not therefore be considered.

MARE.—Both gonadotrophin and oestrogen tests give reliable results during certain stages of pregnancy in the mare. Cole and Hart, in 1930, were the first to show that between the 50th to the 100th day of pregnancy large

quantities of gonadotrophin are present in the blood, and that during this period gonadotrophin tests on blood give very accurate results. Only traces of gonadotrophin were found in the urine. In thoroughbred mares Nicholson (1949) reports that the test is not accurate after the 80th day, and that the most suitable period for testing is between the 40th to 60th day. The gonadotrophin present in the blood of the pregnant mare is endometrial in origin and mainly follicle-stimulating in action (not luteinising as is the chorionic gonadotrophin in human pregnancy urine) so that the gonadotrophin tests mentioned above require some modification before being applied to the mare. Cuboni (1949) has recently shown that, contrary to the general belief, gonadotrophin tests can be applied to pregnant mares' urine over the same period as blood tests provided special concentration methods are used.

Oestrogens appear in the urine of pregnant mares soon after the 60th day. Up to the 120th day biological tests must be used, but after that time the concentration of oestrogen is sufficiently high for a simple chemical test to be used (Cuboni test). The Cuboni test is based on the appearance of a greenish fluorescence which develops when sulphuric acid reacts with oestrogens. This is not a specific test for oestrogens but interfering substances giving false positives are seldom present in the urine. Indeed, Inglis and Robertson (1946) found that positive Cuboni tests were practically 100 per cent. accurate. The Cuboni test is one which can be carried out by the veterinary surgeon in general practice. Details of the method are given by Olbrycht (1942) and Cuboni (1949). Other chemical tests exist, such as those of Kober (1938) and Nicholson (1949), which are more specific and can be used ten to 20 days earlier than the simple Cuboni test, but they are more complicated and time-consuming.

There is also a non-hormonal test which appears to give reliable results in the mare. This depends on changes in the microscopic appearance of the cervical mucus. This test was first described by Kurosawa in 1931 and is generally used in conjunction with clinical examination of the vagina as developed by Benesch in 1925. It has been widely used on the Continent and a high accuracy claimed for it after the 30th day. Its use in this country has been described by Day and Miller (1940), who obtained an accuracy of 97 per cent. when using the test between the 90th and 100th days of gestation.

Cow.—In contrast to the mare, there is as yet no established hormonal test, nor indeed any other type, for pregnancy diagnosis in the cow. Gonadotrophins do not appear to be excreted in the urine. Oestrogens can be detected in the urine by biological methods, but only after the third month when accurate diagnosis can readily be made by clinical methods. The Cuboni test is of no value during any stage of pregnancy in the cow (Cuboni, 1949).

There have been recent reports, however, which may indicate the trend of future developments. Milton (1951) has obtained promising results with a gonadotrophin test using cows' blood after the 30th day of pregnancy. The gonadotrophin is extracted from the blood by a kaolin-adsorption method and the extract injected into male frogs. Bhaduri and Bardhan (1949) have claimed that extracts of faeces from pregnant cows when injected into male toads have a gonadotrophic action, positive results being obtained as early as the 15th and 22nd days after service (Bhaduri, 1950).

In view of the fact that practically all previous attempts to detect gonadotrophins in the blood of the pregnant cow have been unsuccessful further data on, and confirmation of, Milton's findings are awaited with interest. The occurrence of gonadotrophin in faeces as reported by Bhaduri and his co-workers is somewhat unexpected. While it is well established that oestrogens and androgens can appear in the faeces as a result of biliary excretion, the bile would appear to be an unlikely vehicle for the excretion of intact protein hormones. However, aside from the question as to how the gonadotrophin is excreted into the intestine, that it should escape destruction in the gut is in itself of interest. Regarding Bhaduri's findings, a word of caution may not be out of place. Substances having gonadotrophin-like activities are found in plants (see Mitchell, Borasky & Bradbury, 1942) which may be used as fodder for cows; the specificity of the Bhaduri reaction therefore requires careful checking to make sure that positive tests do not arise from substances ingested in the food. Confirmation and extension of Bhaduri's interesting findings are therefore desirable.

Further progress has recently been reported by Glover and Scott Blair (1951) in their studies of the physical changes which occur in bovine cervical mucus during early pregnancy. Characteristic changes have been detected some two to four weeks after service, and it is possible that these changes may form the basis of an accurate test.

Ewe and Goat.—Neither gonadotrophin nor oestrogen tests have as yet proved of any value in these species. Bhaduri (1951) is applying to the goat a modification of his faeces test as described for the cow, but results have not as yet been reliable. Benzie (1951) has shown that for experimental purposes pregnancy can be diagnosed with accuracy in the ewe after the 55th day by using a suitable radiographic method.

Sow.—While there are as yet no tests of established accuracy for pregnancy in the sow, there exist several techniques which must as yet be regarded as experimental. There is evidence from several independent sources that oestrogens are present in the urine of the pregnant sow for a short period in early pregnancy—approximately from the 20th to the 30th days, and biological or chemical tests for oestrogen can be applied during this brief period. Roth, Mayer and Bogart (1941) have described a modified Cuboni test suitable for use during this period. Milton (1951) states that promising results have been obtained by injecting extracts of sows' urine, prepared by the kaolin-adsorption method, into male frogs (*i.e.*, a gonadotrophin test). The reliability of these methods has yet to be established.

Bitch.—Small quantities of oestrogen have been detected in the urine of the bitch after the 18th day of pregnancy, but it is uncertain whether the excretion is sufficiently constant to be used as an indication of pregnancy. Milton (1951) claims useful results after the 15th day by testing extracts of urine in the male frog.

Radiographic diagnosis does not appear to give reliable results until after the seventh or eighth week of gestation.

Many other types of so-called pregnancy tests have been applied to the domestic animals, but they have all proved unreliable. Full references to and further details of them, and of the tests mentioned in this article, will be found in the reviews by Cowie (1948) and Cuboni (1949). Summing up, it may be said that only in the case of the mare are there *established* tests available. So far as the other domestic animals are concerned, the tests mentioned above must be regarded as experimental and of uncertain reliability.

In Great Britain, routine pregnancy tests in the mare are performed in the Department of Veterinary Hygiene, Royal (Dick) Veterinary College, Edinburgh. Tests are also carried out by certain commercial laboratories.

(*References at foot of next column*)

SULPHAQUINOXALINE AND SULPHAMEZATHINE IN THE TREATMENT OF EXPERIMENTALLY INDUCED CAECAL COCCIDIOSIS OF CHICKENS (*E. TENELLA*) AND IN A NATURAL OUTBREAK OF COCCIDIOSIS IN TURKEYS (*E. MELEAGRIDIS* AND *E. MELEAGRIMITIS*)

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Since reports by Horton-Smith and Taylor (1942 and 1943) on the value of sulphamezathine in the treatment of caecal coccidiosis in chicks it has been widely used in this country with almost invariably satisfactory results. From time to time failures have been recorded, probably most frequently due to the lapse of time between acquisition of infection and commencement of treatment. It has been suggested that a restricted consumption of medicated drinking water owing to the unpalatability of the drug is sometimes responsible and fears have been expressed that strains of Eimeria, resistant to the drug, may have been developed.

In 1949 and 1950 a programme designed to test the coccidiostatic properties of a wide range of drugs was carried out; the present paper describes the results obtained with sulphaquinoxaline.

SURVEY OF LITERATURE

Delaplane *et al.* (1947) demonstrated that daily administration of sulphaquinoxaline at a level of 0·15 per cent. in the feed of chicks completely prevented losses from caecal coccidiosis, whereas in three control groups which each received progressively greater numbers of oocysts the mortality rate was 70 per cent., 86 per cent. and 100 per cent. respectively.

At a level of 0·05 per cent. 60 out of 66 birds survived and in a larger experiment when the drug was used intermittently at this level the disease was well controlled. The use of the drug did not interfere with the development of resistance.

Grumbles and Delaplane (1947) showed that sulphaquinoxaline is effective against *E. necatrix* and that treated birds were heavier than controls.

Cuckler and Ott (1947) stated that sulphaquinoxaline has a lethal effect on some of the sporozoites, but their development is not completely inhibited. Large second generation schizonts produce merozoites which, however, appear to be degenerate and do not develop further.

Peterson (1948) confirmed that oocyst formation is completely prevented by the administration of sulphaquinoxaline at the rate of 2 grains per lb. bodyweight not later than 96 hours after infection. Smaller doses gave partial control and the minimum effective level appeared to be 1 grain per lb. bodyweight. This level of intake represented a feed concentration of 0·1 per cent. of a drinking water concentration of 0·04 per cent.

Grumbles and Delaplane (1948) investigated the relative activity of sulphamethazine and sulphaquinoxaline and concluded that 0·05 per cent. of the former and 0·0125 of the latter gave comparable results under field conditions; and Grumbles *et al.* (1948) showed that the continuous feeding of this low concentration of sulphaquinoxaline in all mash rations was an effective method of prevention of the disease.

In this country Kendal (1950) recorded that sulphaquinoxaline at a concentration of 0·05 per cent. in the drinking water proved markedly more effective than sulphamezathine at the same concentration in limiting mortality in caecal coccidiosis of young chicks and Wilson (1950) reported that there is little to choose between 0·2 per cent. sulphamezathine sodium and 0.06 per cent. sulphaquinoxaline sodium for controlling the disease.

PRESENT WORK

It will be readily apparent from the survey of the literature that in America attention has been concentrated mainly on the prophylaxis of the disease by continuous or intermittent administration of low concentrations of the drug, incorporated in the feed. For several reasons this method of universal preventive treatment is not regarded favourably in this country where it is considered sounder to reserve treatment to pens of birds where infection is sufficiently heavy to produce clinical evidence of the disease in a proportion of the occupants. Since inappetence is a common symptom of the disease, the use of medicated drinking water is to be preferred and this method only is considered in the present paper.

Sulphaquinoxaline Merck (2-Sulphanilamido-quinoxaline) was used in the experiments to be described. Two stock solutions were prepared of 5·16 per cent. and 3·44 per cent. respectively of the sodium salt. Two ounces of the former added to a gallon of drinking water produced a 0·06 per cent. concentration; 2 oz. of the latter added to a gallon of water gave a concentration of 0·04 per cent. In order to assess the therapeutic value of these concentrations it was considered essential to have some criterion for comparison, which would be constant. As a result of previous experimentation a 0·2 per cent. solution of sulphamezathine sodium was selected; medication at this concentration, commencing at 48 to 72 hours after infection with doses of sporulated oocysts sufficient to produce mortality rates of 50 to 90 per cent. in control pens, almost invariably prevented any mortality in treated birds.

The requisite dilution was made up daily from the 16 per cent. solution of sulphamezathine sodium prepared by Imperial Chemicals (Pharmaceuticals), Ltd.

All chicks used in the experiments were hatched at the laboratory from eggs from our own stock, from Weybridge

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and from the Brown Leghorn flock maintained at the Poultry Research Centre, Edinburgh, and were reared in isolation in electrically heated tier brooders. When required for experimentation they were transferred to a large brooder house, infected by the introduction of sporulated oocysts by means of a glass pipette directly into the crop, and placed in newly sterilised electrically heated brooders. Every effort was made to reduce the possibility of reinfestation to a minimum. Eight trials, using chicks of different ages and varying degrees of infection, were carried out; in six of them treatment was begun 48 hours after infection, in the others after 72 hours and 84 hours respectively. The fluid intake was measured daily, but the food consumption was not recorded. The number of chicks in each group varied from 21 to 50.

Symptoms of Experimentally Induced Caecal Coccidiosis

There is usually no evidence of illness until about four days after dosing. When massive numbers of sporulated oocysts are given the onset is extremely sudden; in chicks which appear to be completely well at the 84th hour there may be a heavy death-rate between the 96th and 120th hours. Affected chicks appear to be slightly uneasy and may have blood in the droppings as early as the third day, but more usually on the fourth and fifth days. Deaths may occur on the fifth and sixth days, but more commonly on the sixth and seventh days, depending on the age of the chicks and the level of infection.

With lighter infections chicks usually appear quite normal until the fourth and fifth days. They may be slightly noisier and then become very obviously ill. Food is refused and chicks crowd and huddle in the heated chamber of the brooder in utter dejection, reluctant to move, with ruffled feathers and drooping wings. Many droppings appear to consist almost entirely of blood. Most deaths occur during the sixth and seventh days. By the eighth day an obvious improvement is noted in the surviving chicks, a large proportion of which show increased activity and recommence feeding. Improvement is maintained and by the tenth and eleventh days chicks are usually feeding and drinking normally and there is a marked tightening of the plumage.

In treated chicks when the infecting dose of oocysts is light no symptoms may be noted, but when heavy doses are given there are obvious signs of illness, which, however, have a shorter duration than in untreated birds. Blood may be present in the droppings to a limited extent.

Post-mortem Appearances

In birds dying of peracute caecal coccidiosis on the fifth and sixth days after dosing with large numbers of sporulated oocysts both caecal tubes are dilated and consist of sacs containing liquid blood. The caecal walls when viewed from the outside are uniformly reddish in colour or purplish and mottled, with dark red spots clearly visible on the peritoneal surface. In birds dying or killed on the seventh day there is usually a slight thickening of the caecal walls and frequently the lumen contains a slender central clot of blood surrounded by fluid blood, suggesting that considerable haemorrhage is still occurring in the mucosa. In some chicks there is an amorphous accumulation of semi-solid brick-red caseous-like material more or less filling the caeca and in others the material tends to be suspended in a mucus-like fluid. If a number of surviving chicks are killed at this stage the caseous material will be found to be forming a " core " in the shape of a cast of the caecal lumen. Usually the " core " at this time is readily broken up and disintegrates on slight pressure, but in some chicks the lower portion of the core is much firmer and has a thin coating of yellow necrotic material covering it almost like a skin. In these birds recovery is beginning and in chicks killed during the following days the cores are completely covered with a coating of this yellow material. On section it will be seen that this material now penetrates almost to the centre of the core, particularly in the region of the lower extremity, leaving only a little brownish-red semi-solid material in the very small lumen now remaining in the core. Oocysts are numerous in this material, but are usually absent in the actual core. A mucus-like secretion forms between the caecal wall and the core, commencing at its lower extremity, and the core can be readily expelled into the rectum by pressure with the fingers, leaving a slightly thickened but otherwise apparently normal caecal wall. That the cores are expelled in the process of natural recovery was shown by the examination of series of chicks killed on successive days. In many there were cores in both limbs of the caeca, but it was always apparent that one is more " mature " than the other. Later cores were found in one limb only with the other apparently healthy and containing normal brownish-yellow moist faeces and still later the caeca of most of the chicks killed were normal.

These findings support the observations of Röseler (1929) that the caeca empty themselves every 24 to 48 hours and that apparently one caecum empties at a time.

In some recovered chicks a single core of varying size persisted and in odd cases one or both limbs were grossly distended with a large mass of solid yellowish caseous material. A striking and somewhat surprising feature was the very small proportion of survivors which became " carriers."

Large numbers of infected chicks which had been treated with sulphaquinoxaline and sulphamezathine were examined *post-mortem* at varying intervals after the cessation of treatment and generally the caeca were normal; occasionally cores were present. When deaths occurred during treatment lesions similar to those already described were apparent.

Results

The number of chicks used in each experiment, their age, particulars and result of treatment are shown in Table I.

Table I

Summary of Experiments

Experiment	No. of chicks per group	Age of chicks	Interval between infection and treatment	Mortality, Per cent.			
				Sulphaquinoxaline sodium 0·04 per cent.	Sulphaquinoxaline sodium 0·06 per cent.	Sulphamezathine sodium 0·2 per cent.	Control pen
		Days	Hours				
A	22	14	72	4·07	0	0	27·3
B	31	16	72	22·2	6·5	3·3	75·7
C	42	17	72	11·9	0	0	71·4
D	21	17	72	—	0	0	50·0
E	46	21	72	17·7	11·4	—	50·0
F	22	28	48	—	0	0	50·0
G	50	54	72	—	4·0	4·0	92·0
H	45	14	84	40·0	22·7	20·4	45·4

It is readily obvious that the lower concentration of sulphaquinoxaline sodium (0·04 per cent.) is unsuitable for the treatment of acute caecal coccidiosis, resulting from the

ingestion of a single massive dose of infection, and cannot be recommended for use in the field.

In general, the results obtained with the stronger concentration of sulphaquinoxaline sodium (0·06 per cent.) and sulphamezathine sodium (0·2 per cent.) are comparable. It is unfortunate, however, that in Experiment E, which is the only one in which significant mortality occurred following the use of this concentration, a control group receiving sulphamezathine was omitted. The effect of delaying treatment later than 72 hours after infection is clearly shown in Experiment H and demonstrated a C and D is shown in Table II. In all experimental groups the smaller quantities of sulphamezathine sodium consumed were sufficient to produce a satisfactory response. The figures given probably represent a maximal consumption as the chicks were completely confined and were fed on dry mash only.

In birds treated under field conditions, running outside with access to damp grass and fed wet mash, presumably a still smaller quantity of sulphamezathine sodium would be consumed and in some instances it might conceivably prevent an adequate intake of the drug.

TABLE II

WATER CONSUMPTION

Experiment	Brooder	No. of chicks	Age of chicks	Treatment	Before treatment			During treatment			Mortality
					Consumption for 48 hours	Average daily consumption	Daily consumption per chick	Consumption for 5 days	Average daily consumption	Daily consumption per chick	
			Days								
Experiment C, 4.8.50	1	42	17	Sodium sulphaquinoxaline, 0·04 per cent.	4,174	2,087	49·7	11,343	2,268	54·0	11·9
	2	42	17	Sodium sulphaquinoxaline, 0·06 per cent.	3,830	1,915	45·6	10,748	2,149	51·1	Nil.
	3	42	17	Sodium sulphamezathine, 0·2 per cent.	3,879	1,939	46·2	7,120	1,424	33·9	Nil.
	4	42	17	Water only	3,963	1,981	47·1	9,968	1,993	57·5	71·4
Experiment D, 1.9.50	1	21	17	Sodium sulphamezathine, 0·2 per cent.	2,204	1,102	52·5	4,271	854	40·7	Nil.
	2	21	17	Sodium sulphaquinoxaline, 0·06 per cent.	2,469	1,234	58·7	5,734	1,147	54·6	Nil.
	3	20	17	Water only	2,494	1,247	62·3	3,815	763	63·5	50

possible reason for the apparent failure of treatment in some field outbreaks.

Several workers have compared the relative merits of sulphaquinoxaline and sulphamezathine at various concentrations, but as far as treatment is concerned there appears to be no value in considering other than the 0·2 per cent. concentration of sulphamezathine sodium which is the optimum strength at which consistently good results are obtained. Any comparison of therapeutic effects using a lower concentration is, therefore, unfair.

Other factors influencing a choice of drug are palatability, availability and cost.

At the moment sulphaquinoxaline is not available commercially in this country, so that the latter factors cannot be discussed here. The relatively low concentrations of drug required, however, would suggest that its use might not be uneconomical.

Palatability.—The palatability of drugs incorporated in drinking water is of great importance, as if medicated water is obnoxious chicks will not drink it if any other source of drinking water is available. In the absence of an alternative supply, at best a minimum quantity is taken reluctantly by chicks; turkeys may refuse it completely.

Blount (1950) and Wilson (1950) pointed out that sulphamezathine sodium, 0·2 per cent., is not relished by chicks and in the present series of experiments all groups consumed very much less than comparable pens receiving sulphaquinoxaline sodium, 0·04 and 0·06 per cent., which both chicks and turkeys take very readily. This drug is, therefore, particularly valuable in the latter species which frequently refuses to drink 0·2 per cent. sulphamezathine sodium.

The water intake of the various groups in Experiments

Development of Resistance.—Delaplane *et al.* (1947) showed that the ingestion of sulphaquinoxaline did not appear to interfere with the development of resistance to coccidiosis and this was confirmed by Grumbles *et al.* (1948) and Koutz (1948). Two small-scale experiments were carried out to compare the resistance of chicks treated with sulphaquinoxaline sodium and sulphamezathine with that of chicks which had recovered naturally. The chicks used were survivors of Experiment A in which mortality in the control pens was 27 per cent.

Challenging doses of sporulated oocysts approximately equal to, and double that of, the initial infecting dose were given after an interval of seven weeks from the date of previous infection. The results are shown in Table III.

TABLE III

IMMUNITY TRIALS

Previous treatment	2 c.c. oocysts			1 c.c. oocysts		
	No. dosed	No. died	Mortality per cent.	No. dosed	No. died	Mortality per cent.
Sulphaquinoxaline sodium, 0·06 per cent.	12	2	16·6	12	0	0
Sulphaquinoxaline sodium, 0·04 per cent.	8	0	0	8	0	0
Sulphamezathine sodium, 0·2 per cent.	4	0	0	5	0	0
Recovered from natural outbreak with 27 per cent. mortality ...	8	2	25·0	7	0	0
Dosed for first time	8	8	100·0	8	8	100·0

In the group receiving the very massive infection all the healthy controls, a fourth of the recovered birds, and a sixth of the birds receiving sulphaquinoxaline, 0·06 per cent., succumbed. In the second group there was no mortality in any of the previously infected birds, but all the control birds in the pen died.

The number of chicks used is insufficient for statistical consideration, but the results appear to confirm that medication did not interfere with the development of resistance.

After-effects of Treatment.—Twelve survivors from each of the treated pens and the eight remaining control chickens from Experiment B were placed in a single pen and kept under observation until they were four months old. Periodic weighings were carried out; weights are shown in Table IV.

A control pen of undosed birds of the same age and type was not available, so that a strict weight comparison with healthy birds cannot be made. The average gain per bird in all groups is almost identical and the weights achieved are satisfactory for immature pullets four months of age.

It is apparent that medication for a period of five days had no adverse effect on subsequent growth.

Table V

Turkey Coccidiosis—Field Experiment

Deaths

Date	Pen A (200 poults)	Pen B (200 poults)	Pen C (200 poults)
22.8.50	4 S	4	3
23.8.50	3 S	7	7
24.8.50	1 S	12	9
25.8.50	0	15 S	8
26.8.50	1	3 S	7
27.8.50	0	1 S	9
28.8.50	0	0	7
29.8.50	0	0	9
30.8.50	0	0	6
31.8.50	0	0	6 S
1.9.50	0	0	7 S
2.9.50	0	0	3 S
3.9.50	0	0	0
4.9.50	0	0	0
5.9.50	0	0	0
6.9.50	0	0	0

S = Drinking water replaced by 0·06 per cent. sulphaquinoxaline sodium solution.

Table IV

Growth Rates

Pen	Treatment	No. of chicks	Average weight 42 days		Average weight 47 days		Average weight 67 days		Average weight 94 days		Average weight 123 days		Average gain	
			lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.
A	Sulphaquinoxaline, 0·04 per cent.	12	1	1	1	6	2	8	3	1	4	2	3	1
B	Sulphaquinoxaline, 0·06 per cent.	12	1	–	1	6	2	7	3	1	4	1	3	1
C	Sulphamezathine, 0·2 per cent.	12	1	4	1	8	2	10	3	–	4	4	3	0
D	Water only	8	1	2	1	6	2	7	3	6	4	4	3	2

Sulphaquinoxaline in Coccidiosis of the Turkey (*E. Meleagridis* and *E. Meleagrimitis*)

The successful treatment of coccidiosis of turkeys with sulphaquinoxaline has been reported by Moore (1949), Morehouse (1949) and Peterson (1949).

Field trials were made on a large turkey rearing plant in which sulphamezathine had been tried unsuccessfully in earlier outbreaks owing to the turkeys refusing to drink the medicated water.

The disease was diagnosed in three pens each containing 200 poults, of the same age, in which symptoms of illness and deaths had occurred.

In one group of poults (Pen A) drinking water was replaced by 0·06 per cent. sulphaquinoxaline sodium, the remaining pens (B and C) were left untreated as controls.

In view of the cessation of deaths and general improvement in the treated pen compared with the continuing mortality in pens B and C, poults in Pen B also received a course of treatment for three days.

As a result of the success of treatment in these two pens and the continuing deaths in Pen C, in which 65 poults had died during the course of the experiment, it was felt that this pen should also receive treatment; this was again followed by a complete cessation of mortality. Results are tabulated in Table V.

The impracticability of keeping a control pen throughout the entire period of the experiment detracts somewhat from the value of the findings, but, on the other hand, Pen C was in every respect a true control during the first nine days of the experiment. It seems valid, therefore, to conclude that 0·06 per cent. sulphaquinoxaline sodium is an effective agent against coccidiosis in the turkey. It is planned to carry out further therapeutic trials in the laboratory.

Discussion

The treatment of experimentally induced coccidiosis with sulphaquinoxaline sodium, 0·04 and 0·06 per cent., and sulphamezathine sodium, 0·2 per cent., in the drinking water has been described fully. The results obtained confirm the findings of previous workers and our own earlier experience that 0·2 per cent. sulphamezathine sodium is a most effective agent in the treatment of caecal coccidiosis and when used at this concentration was never inferior to sulphaquinoxaline sodium, 0·06 per cent. In assessing the relative merits of these two drugs it is suggested that valuable and legitimate comparisons can be made only at these levels; the use of lesser concentrations cannot be recommended. If the former sometimes gave slightly better results under the very prescribed environmental conditions of

the experiment, the latter was decidedly more palatable and this is probably of considerable importance under field conditions. This aspect is of even greater importance in the turkey and pheasant; cage birds also appear to take sulphaquinoxaline more readily. The treatment of coccidiosis in chickens and turkeys is often on a very large scale and, other factors being equal, the ultimate choice of drug will depend chiefly on the cost. This aspect cannot be discussed, for the reasons already stated, but the very much smaller amount of sulphaquinoxaline required might suggest that if it became available it might represent a more economic treatment.

Summary

There is little to choose between the therapeutic effect of 0·2 per cent. sulphamezathine sodium and 0·06 per cent. sulphaquinoxaline sodium in the treatment of acute caecal coccidiosis of chicks experimentally induced by the single administration of large numbers of sporulated oocysts of *E. tenella*.

Its successful use in a natural outbreak of coccidiosis in turkeys is described.

Sulphaquinoxaline sodium is much more palatable than sulphamezathine sodium and is thus to be preferred in the treatment of coccidiosis in turkeys and pheasants. The ingestion of sulphaquinoxaline sodium did not interfere with the production of resistance nor have any adverse effect on growth.

The very small quantities required suggest that it might become a more economic form of treatment.

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Weekly Wisdom

A professional man cannot admit to having an employer in the full sense; he must work, not as an employer's agent, but as his judgment directs. . . . The democracies cannot survive unless their rulers can count on continual help from the professions, and certainly the professions cannot remain free if the democracies perish.—Dr. T. F. Fox (Croonian Lecture at the Royal College of Physicians, May 17th, 1951).

* * * * *

When Blackpool's landau horses—about 80 of them—paraded at the police station for their annual inspection, which they must pass before being allowed to work during the summer season, the veterinary surgeon, Mr. R. T. Wiggins, paid tribute to their high quality.

* * * * *

Mr. G. Waterhouse, New House Farm, Holmbridge, Huddersfield, found five of his pedigree Ayrshire cows had been electrocuted in their stalls.

CLINICAL COMMUNICATION

TREATMENT OF TROPICAL ULCERS IN EQUINES WITH YEAST

J. F. F. CALLEAR

Department of Agriculture, British Guiana

Dr. T. C. Hallinan, in a recent contribution to the medical Press, records the successful treatment in Jamaica of 188 cases of tropical ulcers in human beings by direct application of dried Torula yeast (food yeast). He combined this with 1 drachm of the yeast in the food three times a day. He had no failures and only one relapse. He discusses the likelihood of such ulcers being due to a vitamin deficiency, since—

(1) they occur chiefly among people whose diet is deficient in vitamin B;

(2) they occur mainly in tropical countries, and especially during and towards the end of the hot season when the body stores of vitamin B will have been further depleted by increasing sweating (recent work having shown that vitamin B alone is excreted in the sweat).

Similar conditions occur in the Equidae in this and many other tropical countries. The lesions are usually large and may occur anywhere on the body or legs. There is more or less profuse suppuration. They steadfastly resist treatment by the sulphonamides, penicillin, acriflavine, sulphur and salicylic acid and many other drugs which have been tried. In cases where "proud flesh" grows out of such lesions, silver nitrate and copper sulphate have reduced this slightly, but understandably have served to increase suppuration.

It was decided to attempt to treat such conditions along the same lines as in the human, and while only four cases so far have been treated, all responded exceedingly well. It was not possible at the time to obtain any food yeast, so an ordinary proprietary brand of dried yeast was used.

Case 1.—A Jack donkey, aged seven years. A large suppurating ulcer covered the outside of the near fore fetlock and extended one-third of the way up the cannon, measuring 5½ inches by 3 inches at the widest part. The case was of eight or nine months' standing, and "proud flesh" had previously been reduced with copper sulphate applied directly. The usual treatments had been tried without success. About 4 oz. of dried yeast was taken and moistened to the consistency of baker's yeast. It was placed as a ½-inch-thick pad on a piece of lint 6 inches by 8 inches and shaped so as to extend slightly beyond the edge of the ulcer. It was left for a week and reinspected. Healing was clearly taking place, and the lesion had contracted to 4½ inches by 2½ inches, while ¼ inch of clean new skin had grown in from the edge all round. The dressings were changed weekly; the third week the remaining lesion was 1 inch across and circular. By the fourth week it had healed.

Case 2.—A large Jack donkey. The lesion was across the withers 6 inches by 4 inches; another smaller one on the inside of the fore cannon high up. Treatment was as in Case 1 and healing was complete in three weeks for the smaller lesion and in six for the larger.

Case 3.—A Sugar-estate mule, female, aged. Ulcerative lesions covering the inside of the fore cannons caused originally by the legs having gone through the rotted timbers of a bridge. Previous treatment unsuccessful. In

this case much irritation was felt by the animal which was very difficult to restrain from tearing off any dressings applied. Healing with the yeast treatment was thus prolonged, but after ten weeks has now progressed well. In this case it has been advised to feed rum-yeast, which is readily available, to try to hasten the protracted period.

Case 4.—A Police horse, entire, aged seven years. Small ulcers on hind fetlock joints, resistant to treatment and starting to spread upwards. Yeast applied. Healing apparent after one week and complete in three.

Attempts are now being made to obtain Torula yeast from Colonial Food Yeast Limited, of Jamaica (a subsidiary of the Colonial Products Research Council). It is said to contain a proteolytic enzyme which may help to cause more rapid disappearance of pus and sloughs from the ulcers. This would hasten healing and make it a superior product to ordinary yeast for our purpose.

Interim Conclusion.—Ulcers in equines in this tropical climate have been shown in four cases to respond favourably to direct application of yeast. The comparative infrequency of meeting such cases here has prompted the author to comment on the treatment at this early stage in the hope that others with greater opportunity may provide more data on its possible efficacy.

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THE HANNAH DAIRY RESEARCH INSTITUTE: ITS ORIGIN AND DEVELOPMENT

The Hannah Dairy Research Institute has a short but notable history. It was conceived by the Development Commissioners in 1927, and nurtured by public subscription. Its present establishment is due to the benefaction of the late John M. Hannah, of Girvan Mains, Ayrshire. By his gift the larger portion of the Auchencruive estate was given to the West of Scotland Agricultural College, while the adjoining farm of Kirkhill was made available to the then newly established Institute.

The work here has flourished, touching on such diverse subjects as crop and stock husbandry and farm management, nutrition, biochemistry, bacteriology, and technical chemistry.

Recent additions have been made to the original buildings, and these include a metabolism house, experimental calf rooms, a goat house, and a psychrometric room.

It is, perhaps, difficult to understand why a separate veterinary section in the Institute, which had in the past done such valuable work on bovine diseases such as tuberculosis, mastitis, abortion, and sterility, appears to have been in abeyance since the veterinary officer in charge of that section obtained another post. Almost all of the work which is carried on at the Institute would benefit immeasurably from the collaboration of a veterinary surgeon, and it is to be hoped that the Institute will speedily rectify this woeful hiatus in an otherwise admirable scientific programme.

* * * * *

Report on the National Milk Records for the Year 1951.—The present position with regard to the National Milk Records, as shown in the current report for England and Wales, is an impressive example of expansion both quantitatively and qualitatively. Emphasis is placed on butter-fat testing, and some 1,500 progeny recorded bulls appear in this year's issue.

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Figures issued by the Scottish N.F.U. show that more livestock are being raised in Scotland, and in the Highland region there are 72 per cent. more beef cattle than before the war. Only in sheep has there been a decline.

ABSTRACT

[The Use of Chicks for the Biological Assay of Members of the Vitamin B Complex. Coates, M. E., Kon, S. K., & Shepheard, E. E. *Brit. J. Nutrit.* **4**. 203–221.]

The authors describe a series of experiments to devise a general method which could be adapted to the biological determination of as many different vitamins as possible and to choose a diet with components of known chemical composition, whose quality could be standardised. Such biological assay would serve as a check on microbiological techniques which, in common with chemical methods, can only rarely be directly applied to the assay of natural materials.

A synthetic diet was devised which, when fully supplemented with the known vitamins, supported nearly normal growth in chicks up to four weeks of age. When nicotinic acid, pyridoxin, riboflavin, pantothenic acid, folic acid, or biotin was omitted the chicks developed typical signs of deficiency of the missing vitamin. Symptoms of these deficiencies were briefly as follows:—

Nicotinic Acid.—There was poor growth and appetite, feathering, retarded comb development, and frequently perosis. The few birds dying revealed no striking abnormality at autopsy. All birds showed "parrot beak" with white tongue tips and red inflamed mouth.

Pyridoxin.—There was marked depression of growth, with nervous symptoms developing in the second week. Extreme restlessness and excitement followed by fits of vertigo and tremors, and in more severe cases convulsions resulting in death. *Post-mortem* examination showed enlarged gall bladders and occasionally pale livers and spleens.

Pantothenic Acid.—There was depression of growth with the distinctive appearance of dermatitis round the beak; closure of eyelids with sticky exudate. *Post-mortem* lesions were enlarged gall bladder and occasionally dark and patchy livers.

Riboflavin.—There was poor growth and "knobbly feet"—a condition found to precede "curled toe" paralysis—followed in the third week by diarrhoea. *Post-mortem* lesions were enlarged gall bladder and yellow livers.

Folic Acid.—Birds remained normal until the second week of test, when growth rate declined, the combs and mouth parts appearing extremely pale. Feathering was poor and wing feathers became brittle and ragged. *Post-mortem* lesions were few but extreme pallor of organs was a feature. Haemoglobin measurements and erythrocyte counts were considerably lower than normal.

Biotin.—General condition of birds was good for two weeks, after which cases of perosis were seen, and withered tongue tips occurred frequently. "Parrot beak" with marked scaliness and deep cracks developing in the underside of feet.

Dose response curves were constructed for nicotinic acid and pyridoxin, riboflavin and pantothenic acid with change in bodyweight, and for folic acid the change in haemoglobin level as the criterion of response. No measurable criterion was found for biotin within the first four weeks of the chick's life. Methods used proved suitable for rigid statistical interpretation and yielded satisfactory estimates of potency of preparations of pure vitamins whose concentration was not disclosed until after the test, and it was found that an improvement in response was obtained when diet was given in granulated rather than in powdery form.

J. MacK.

REVIEW

[The Feeding of Farm Animals in India. By P. E. Lander, M.A., D.Sc. Pp. 492. Published by Macmillan & Co., St. Martin's Street, London, W.C.2. Price 25s.]

In 1942 the Indian Council of Agricultural Research set out on a rather ambitious programme to produce a series of manuals dealing with all aspects of the agricultural industry in India, and the volume now under review appears to be the first of these manuals to be issued.

It is stated that manuals on other Animal Husbandry subjects are well under way, and if they maintain the very high standard set in this first volume, both in the subject matter and its presentation, we shall look forward to their publication with the greatest interest.

The Council's programme is ambitious, not only in the large field which it is proposed to cover in this series, but also in the scope of each volume, which is designed to meet the needs of both the scientist and the farmer. This, of course, is by no means an easy thing to do, but in the volume under review this aim has been well accomplished and it would be difficult to find in one volume a greater wealth of facts and figures, tables and illustrations, suitable for reference by anyone whose calling involves the growing of hay and other fodder crops, their collection and conservation, and their appropriate use in the feeding of all classes of farm animals, including cattle, buffaloes, horses, mules, pigs, sheep, goats, camels and poultry.

Being written more especially for Indian conditions, it is only natural that special attention should be paid to the feeding of cattle, on which animal by far the largest amount of statistical data is available in India, much of which has been compiled by the author himself. In the case of other animals, either standards compiled by other workers like Morrison and Wood have been adapted to suit Indian conditions, or use has been made of the practical results obtained by such organisations as the Military Farms Department and the Army Veterinary Department in India.

The first five chapters deal respectively with the soil, constituents of feeding-stuffs, the physiology of digestion, maintenance and production, and feeding standards, and these have a universal application. The latter part of the book then proceeds to a more detailed description of how to feed each class of animal under Indian conditions and finally there is a set of appendices, which include an exhaustive list of all types of animal feeding-stuffs, showing their chemical composition and digestible nutrients.

Altogether we may recommend without hesitation that this manual should be on the bookshelf of everyone concerned with the feeding of animals in the tropics and subtropics.

The Agricultural Census of January 1st, 1951, in Northern Ireland shows that there have been falls in the numbers of cattle, sheep and poultry since January 1st, 1950, while there was a slight increase in the number of pigs. The biggest decline took place in poultry numbers.

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The Reindeer Council of the United Kingdom has decided to proceed with the experiment of importing reindeer into Scotland, and the council's technical adviser will inspect various areas which might be suitable for rearing the animals.

NOTES AND NEWS

Diary of Events

May 30th.—Annual General Meeting of the West of Scotland Division, N.V.M.A., at Glasgow (North British Station Hotel), 2.30 p.m.

May 31st.—Summer Meeting of the Central Veterinary Society. (See Notice.)

June 1st.—Meeting of the South Wales Division, N.V.M.A., at Llandilo (Cawdor Arms Hotel), 2.15 p.m.

June 5th.—Fifth in the series of Almroth Wright Lectures. The Wright-Fleming Institute of Microbiology, St. Mary's Hospital Medical School, London, W.2: R. Lovell, D.Sc., M.R.C.V.S. (Royal Veterinary College), "Infection and Resistance in Young Animals," 5 p.m.

June 6th.—108th Annual General Meeting of the Royal College of Veterinary Surgeons at 10, Red Lion Square, London, W.C.1, 12 noon.

June 6th.—Annual General Meeting of the Victoria Veterinary Benevolent Fund, at 10, Red Lion Square, London, W.C.1—immediately following the above.

June 6th, 7th and 8th.—Meetings of Committees and Council, R.C.V.S., at 10, Red Lion Square, London, W.C.1.

June 7th.—R.A.V.C. Golfing Society Meeting. (See Notice.)

June 8th.—Annual Dinner of the R.A.V.C. Officers Club, Grosvenor House, London.

June 14th.—Meeting of the Western Counties Division, N.V.M.A., at Exeter (Imperial Hotel), 2 p.m.

Sept. 23rd-29th.—Sixty-ninth Annual General Meeting and Congress of the National Veterinary Medical Association, at Eastbourne.

N.V.M.A. Meetings in Edinburgh

Wednesday, July 11th:
11 a.m. Home Appointments Committee.
2 p.m Organising Committee.
4 p.m. Parliamentary and Public Relations Committee.

Thursday, July 12th:
11 a.m. Veterinary State Medicine Committee.
2 p.m. General Purposes and Finance Committee.

Friday, July 13th:
11 a.m. Council.

R.C.V.S. Examinations

Thursday, June 7th.—D.V.S.M. Written Examinations commence at Edinburgh.
Monday, June 11th.—D.V.S.M. Oral Examinations commence.
Thursday, June 21st.—M.R.C.V.S. Written Examinations.
Friday, June 22nd.—M.R.C.V.S. Written Examinations.

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PERSONAL

Appointments.—The appointment in the Colonial Veterinary Service is announced of Dr. James Anderson, D.Sc. (Edin.), Ph.D. (Edin.); M.R.C.V.S., Senior Veterinary Research Officer, Kenya, as Assistant Director of Veterinary Research, Kenya; also the appointments of Mr. D. A. Brown, M.R.C.V.S., as Veterinary Officer in the Service, and of Mr. C. D. Harris, M.R.C.V.S., as Veterinary Officer (temporary), Nigeria.

New Post for Mr. J. W. Simpson.—In its issue of May 11th the *Carmarthen Journal* states that Mr. J. W. Simpson, B.Sc., M.R.C.V.S., Veterinary Officer, Ministry of Agriculture and Fisheries, will be leaving Carmarthenshire early in June to assume new responsibilities as Divisional Veterinary Officer for Flintshire. "During his long service here as Deputy Divisional Veterinary Officer he has, in addition to all his varied duties, influenced continuously the progress of the attested herd scheme, which is now approaching the final stages in the eradication of bovine tuberculosis from the cattle of South-west Wales. His cheery, energetic personality will be missed in this district. This year he is President of the South Wales Division of the National Veterinary Medical Association.

"His many friends will be glad to hear of his promotion; will join in congratulating him and in wishing him every success and happiness in his new sphere."

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Births.—Macrae.—On May 11th, 1951, at Sleaford, Lincs, to Joan (*née* Beetham), wife of Major R. I. Macrae, M.R.C.V.S., a son—John.

Porteous.—On May 4th, 1951, to Joyce (*née* Nicholson) and A. J. Porteous, Belle View, Stokesley, Yorks, a son.

Marriage.—Horrox—Sickling.—On May 19th, 1951, at All Saints' Church, Spofforth, Harrogate, Michael A. Horrox, M.R.C.V.S., second son of Mr. and Mrs. R. O. Horrox, Bramhope, Leeds, to Jean Fowler, second daughter of Mr. and Mrs. C. Sickling, Lodge Farm, Wetherby.

. . . . . .

Dr. R. Lovell to give Almroth Wright Lecture.—Our readers will have noted with appreciation as an honour to our profession, that as intimated in our Diary of Events, Dr. Reginald Lovell, M.R.C.V.S., of the Royal Veterinary College, is included in the list of distinguished contributors to this year's series of Almroth Wright Lectures. The subject of Dr. Lovell's lecture is "Infection and Resistance in Young Animals" and we trust that the interest of the subject to veterinarians and the importance of the occasion will combine to attract a large attendance of members of our profession at the Wright-Fleming Institute of Microbiology, St. Mary's Hospital Medical School, London, W.2, at 5 p.m. on Tuesday, June 5th.

. . . . . .

Will.—Hughes, Mr. Richard, F.R.C.V.S., of Oswestry, retired veterinary surgeon, £51,299.

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R.C.V.S OBITUARY

Howells, Rees Trevor, Old Porch House, Bishop's Castle, Salop. Graduated, London, July 13th, 1922. Died May 10th, 1951; aged 56 years.

Senior, Walter Graham, 1, Cambrian Villas, Hop Garden Road, Henley-on-Thames, Oxon. Graduated N. Edinburgh, May 26th, 1893. Died April 30th, 1951; aged 85 years.

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Medicine and the Festival of Britain

R.S.M. and B.M.A. Joint Series of Symposia

We are asked to state that the attendance of members of the veterinary profession will be welcomed at the series of festival scientific meetings jointly organised by the Royal Society of Medicine and the British Medical Association to be held in the Barnes Hall, Royal Society of Medicine, 1, Wimpole Street, London, W.1, from June 4th to July 9th.

The first meeting, on Monday, June 4th, over which Sir Henry Dale, O.M., F.R.S., will preside, is to be devoted to the Peripheral Nervous System and belongs to the group of systematic discussions, of which other representatives are the Central Nervous System (June 14th) under the chairmanship of Dr. Russell Brain, F.R.C.P., and the Vascular System (June 8th) under Sir John Parkinson. The different specialities will be represented, and Dr. A. W. S. Sichel, President-Elect of the B.M.A., will preside over Ophthalmology (June 11th), Sir Gordon Gordon-Taylor over Plastic Surgery (June 12th), Sir Philip Manson-Bahr over Tropical Medicine (June 26th), and Sir William Kelsey Fry over Odontology (July 9th). The organisers have chosen as further subjects Antibiotics, over which Sir Alexander Fleming, F.R.S., presides (June 7th), and "Cortisone" and A.C.T.H. with Professor G. R. Cameron, F.R.S. (June 25th) as chairman. The problems of the present are suggested by the meetings on Cardiovascular Disease in an Ageing Population, with Dr. J. H. Sheldon in the chair (June 22nd), and the fears of the future by Burns, under Dr. Leonard Colebrook, F.R.S. (June 19th). The changing fashions of disease are illustrated by the meeting on the Decline of Infant Mortality, which Sir Allen Daley convenes (June 19th), and the meeting on the rise in Peptic Ulcer (June 20th), at which Sir Henry Cohen, President of the B.M.A., will be in the chair.

There are many other interesting and important topics from which to choose and a full programme and application forms for tickets may be had from the Joint Secretary of Symposia, B.M.A. House, Tavistock Square, W.C.1.

Festival Lecture

Sir Henry Dale, O.M., F.R.S., will deliver the Festival Lecture in the Great Hall, B.M.A. House, on Wednesday, June 20th, at 6.30 p.m. His title is "Medicine Yesterday and To-morrow." The chairman will be Lord Webb-Johnson, President of the Royal Society of Medicine. This lecture is open to the lay public, as well as to the medical profession, and applications for tickets should be made as soon as possible to the Public Relations Officer, B.M.A. House, Tavistock Square, London, W.C.1.

ROYAL COLLEGE OF VETERINARY SURGEONS

Animal Management Examination

List of Successful Candidates

(*Continued from page 366*)

Edinburgh:

Archibald, D. R. N.
Barlow, R. M.
Billings, P. R. H.
Campbell, H. M.
Chong, S. N.
Clarke, Miss C. E. (Credit)
Davidson, H. J.
Fraser, Donald
Fraser, D. G.
Fraser, J. A.
Gaunt, J. L.
Gilchrist, Miss H. G. R.
Green, W. C.
Griffiths, B. C. R.
Griffiths, T. G. G. (Credit)
Guilor, Miss Mary
Hands, R. R.
Hunt, D. T.
Kerr, J. B. C.
McAlfister, Joseph
Mitcheson, J. A. J.
Peden, A. B.
Reid, G. S.
Rodger, D. S.
Scoggins, Miss J. M. T.
Shannon, David
Shields, W. G.
Stevenson, R. B.
Stewart, A. F.
Taylor, A. R.
Thorne, J. P.
Trainer, P. E.
Vizard, D. J.
Walker, A. I. T.
Watson, Michael
Wetherill, G. D. (Credit)
Windsor, Miss M. D. (Credit)
Wright, Daniel

Pharmacology, etc., Examination

London:

Cochrane-Dyet, I. G. G.
Cunningham, J. A.
Rossdale, P. D.
Rucker, Miss J. W.

(*To be continued*)

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ADDRESSES OF DISEASE-INFECTED PREMISES

The list given below indicates, first, the county in which are situated the premises on which disease has been confirmed, followed by the postal address and date of outbreak.

Swine Fever:

Ayrshire.—Whittleburn Farm, Largs (May 16th).
Beds.—Knolls Farm, Clifton, Shefford (May 16th).
Cumberland.—Home Farm, Birkby, Maryport (May 16th).
Derbys.—Cotton's Farm, Sinfin Lane, Derby (May 18th).
Flints.—131, Brunswick Road, Buckley, Mold (May 15th); Glenfield, Middle Lane, Kinnerton (May 19th).
Lancs.—Stirrup Farm, Church Lane, Lowton, Warrington (May 11th); Wrightington Hospital, Wrightington, Wigan (May 15th).
Lincs.—Chapel Lane, Broughton, Brigg (May 11th).
Lincs (Kesteven).—Crown Lane, Thurlby, Bourne; Halfleet, Market Deeping, Peterborough (May 18th).
Lincs (Holland).—Maze Farm, Long Sutton, Spalding (May 15th); King Edward Farm, Harrold Bridge, Gorefield, Wisbech (May 16th); The Chequers, Weston Spalding (May 17th); Willow Tree Farm, Bird's Drove, Spalding (May 19th).
Middlesex.—The Limes, Coolgardie Road, Park Road, Feltham (May 17th).
Norfolk.—Stanninghall Farm, Stanninghall, Crostwick, Norwich; Paper Hall Farm, Snettisham, Kings Lynn; "The Laurels," Norwich Road, Lingwood, Norwich (May 15th).
Notts.—Thurgarton Priory, Thurgarton; Leeming Lane North, Mansfield, Woodhouse, Mansfield (May 15th).
Roxburgh.—Berryhill Farm, Kelso (May 18th).
Surrey.—Hereford House, Smallfield, Horley (May 15th).
Yorks (E.R.).—15, Linkfield Road, Cottingham Road, Hull (May 15th); 19, Cherry Tree Terrace, Cherry Tree Lane, Beverley (May 18th).
Yorks (W.R.).—No. 5 Group Allotments, Bungalow Road, Edlington, Doncaster (May 17th).

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"NATIONAL GALLERY OF BRITISH SPORTS AND PASTIMES"

Disposal of the Hutchinson Collection

Many will read with regret of the announcement made by Messrs. Christie that they have been instructed by Messrs. Hutchinson and Co., the publishers, to dispose by auction of the Hutchinson collection of about 4,000 pictures, drawings, and prints illustrating virtually every aspect of British sport and pastimes, both past and present.

This collection was formed by Mr. Walter Hutchinson, head of the publishing firm, who died in April, 1950, with the intention of forming in London a centre at which there would be preserved all phases of British sporting art. For this purpose he bought, in 1946,

Derby House, in Stratford Place, W., which he renamed Hutchinson House. There he established what he called "The National Gallery of British Sports and Pastimes," which was opened to the public in February, 1949.

The auctioneers will hold the first sale on July 20th, and other sales will follow during the autumn. These later auctions will enable some of the pictures to be seen during the run of the Exhibition of National Sporting Trophies now being held at Hutchinson House.

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ANTHRAX CONTROL

In its issue of May 11th, the *Western Gazette* states that the announcement that the Ministry of Agriculture was willing to supply vaccine free of charge to practitioners in areas liable to be infected with anthrax was received with satisfaction at a meeting of the Wells and Glastonbury branch of the National Farmers' Union.

"Union headquarters wrote concerning proposals put forward by the Somerset County Council regarding anthrax. They stated that it was understood that the Ministry would not be prepared to agree to the suggestion of scheduling areas affected with anthrax or to introduce compulsory vaccination of animals in any area. There did appear to be an area in the Godney district, however, which was specially liable to the disease. In such areas the Ministry was willing to supply veterinary surgeons there with vaccine free of charge in order that stock-owners who desired it might have their animals vaccinated.

"Concerning the use of flame guns for the disposal of carcases of animals which had died from anthrax, the letter stated that this was a matter for the local authority, who was responsible for the destruction of the carcases. The Somerset County Council had agreed to spend £200 on two batteries of paraffin-burning flame throwers.

"Mr. C. Harding (Godney) thought the arrangements would meet the case. Personally he did not think they wanted to schedule affected areas, otherwise it would be harmful to the business of farmers in the area.

"Mr. R. W. Cotton said the County Council had acquired the flame throwers and they had been found to be satisfactory in disposing of carcases and to be cheaper than using coal."

CORRESPONDENCE

The views expressed in letters addressed to the Editor represent the personal opinions of the writer only and their publication does not imply endorsement by the N.V.M.A.

A NEW TAENIACIDE FOR DOGS

Sir,—The appearance of the report by Biddis in the December 30th issue of *The Veterinary Record*, under the above title, prompts me to report some of our experiences with the same drug (Dicestal, May & Baker).

We have used the drug on a small number of dogs and so far our only interest in it has been as a possible substitute for arecoline hydrobromide for the removal of the hydatid tapeworm, *Echinococcus granulosus*.

It has been stated that the drug causes degeneration of the worms so that when they are passed in the faeces their recognition is difficult or impossible. For this reason it is not possible to do a critical test of its efficiency, where the number of worms passed can be related to the number remaining after treatment.

The results obtained by Batham (*Parasitology*, **37**, 185, 1946) have confirmed that, provided adequate purgation is achieved, the efficiency of arecoline hydrobromide against Echinococcus in the dog is high. In our experiments, therefore, arecoline hydrobromide or arecoline acetarsol has been used to detect failure, on the part of Dicestal, to remove all the tapeworms harboured.

Five working sheep dogs were dosed with Dicestal at the rate of 0·2 g. per kg. bodyweight. A few days later they were dosed with arecoline hydrobromide and the faeces passed sent to the laboratory, where they were screened and examined for the presence of tapeworms. Samples from two dogs yielded two and 55 specimens of Echinococcus.

Three working sheep dogs at this laboratory were dosed with Dicestal at the above dose rate. A few days later all were dosed with arecoline acetarsol and from one of the dogs six Echinococcus were recovered.

All of the above dogs were dosed under field conditions and no attempt was made to detect an infestation before the animals were treated. It is very likely, therefore, that several of them harboured no tapeworms at all.

An additional animal was infected artificially with Echinococcus by feeding it with 1·0 ml. of fresh hydatid scolices. A month later it was dosed with Dicestal, and four days after dosing it was killed. From the intestine 134 Echinococcus were recovered, together with 879 Uncinaria and seven Trichuris.

The data obtained from these experiments do not allow an accurate assessment of the value of the drug against Echinococcus, as there is no way of determining the pretreatment level of infestation. They do suggest, however, that in a large percentage of cases the removal of the infestation is incomplete.

Yours faithfully,

L. K. Whitten.

Wallaceville Animal Research Station,
Department of Agriculture,
Wellington, New Zealand.
April 16th, 1951.

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THE ECONOMICS OF VETERINARY PRACTICE

Sir,—It is difficult to understand Mr. Payne's outright condemnation of the suggested delineation of conditions which would prove wholly amenable to veterinary surgeons in a nationalised service. It is not suggested that such a service is either a desirable or an immediate necessity. However, changing social conditions may cause a nationalised service to be reconsidered as the lesser of two evils, and a further and more objectionable possibility is the cursory formation of such a service by some future Government.

It will, I think, be readily granted that the medical profession is one of the most powerful in the country, yet that great and august body was summarily and apparently finally converted into what amounts to a branch of the Civil Service by an Act of Parliament which was, amidst uproar and indignation, rushed through the House in almost indecent but very successful haste. Such, indeed, was the speed of this *coup d'etat* that the medical profession were not able to present a united front, and, in their confused indecision, were jockeyed into accepting conditions which are far from perfect and which, in some aspects, have acted corrosively upon the intrinsic nature of the profession.

Having this singular and depressing precedent still fresh in our memories would seem to me to be the most imperative motive for examining, assessing and agreeing upon the conditions under which a nationalised veterinary service could be made to function to the satisfaction of all concerned. In doing so the veterinary profession would, in the future, be able to demand what might become desirable, or modify the nature of an imminent imposition. It is surely a universal phenomenon of society that the weak are always exploited, and a body divided within itself is always weak. To prepare against a future possibility by reaching agreement upon basic principles would seem to be both the wisest and simplest of normal precautions.

Yours faithfully,

Denis Branagan.

39a, Clifton Gardens,
Maida Vale, W.9.
May 11th, 1951.

DISEASES OF ANIMALS ACT, 1950—GREAT BRITAIN

Summary of Returns of Confirmed Outbreaks of Scheduled (Notifiable) Diseases

Period	Anthrax	Foot-and-mouth	Fowl Pest	Parasitic Mange*	Sheep Scab	Swine Fever
April 16th to 30th 1951	26	—	6	—	—	32
Corresponding period in—						
1950	17	—	9	—	—	1
1949	16	—	22	—	1	1
1948	5	—	6	—	2	2
Jan. 1st to Apr. 30th, 1951	194	17	457	—	4	280
Corresponding period in—						
1950	155	12	69	—	19	2
1949	64	11	162	—	27	5
1948	40	—	161	1	23	13

* Excluding outbreaks in Army Horses.

Tuberculosis (Attested Herds) Schemes

The number of Attested Herds, *i.e.*, herds officially certified as free from Tuberculosis as at April 30th, 1951, was as follows:—

England	Wales	Scotland	Total (Great Britain)
28,714	16,861	14,414	59,989

N.V.M.A. CONGRESS, 1951

Revised Programme

Congress Meetings will be held in the Floral Hall, Winter Garden, Eastbourne

Sunday, September 23rd

EVENING: 8.0. Reception by Sussex and South-Eastern Counties Divisions.

Monday, September 24th

MORNING: 10.0. Civic Opening of Congress by His Worship the Mayor of Eastbourne.
10.30. Opening of Exhibition of Surgical Instruments, Drugs, etc., by the President, N.V.M.A.
11.30. Sectional Meetings.

AFTERNOON: 2.30. *Address*: "Control of Diseases of Livestock: a comparison of methods in different countries and their significance," by Sir Thomas Dalling, M.A., M.R.C.V.S., F.R.S.E., Chief Veterinary Officer, Ministry of Agriculture, followed by an address on the same subject by Dr. L. P. de Vries, Secretary, Animal Health Service, The Hague, Holland; and also by an American contributor.

EVENING: 8.30. Civic Reception, Dance and Cabaret, given by the Mayor and Mayoress of Eastbourne, at the Winter Garden, Devonshire Park, Eastbourne.

Tuesday, September 25th

MORNING: 9.30. *Paper*: "Johne's Disease, its Diagnosis and Control," by Dr. A. W. Taylor, M.R.C.V.S., of Compton. Opener: Mr. H. T. Matthews, B.V.SC., F.R.C.V.S., D.V.H.

AFTERNOON: 2.30. Small Animal Surgery, including X-rays, in the Gas Theatre, Eastbourne.
Ladies' Excursion.

EVENING: 8.30. Reception and Dance given by the President, N.V.M.A. at the Grand Hotel, Eastbourne.

Wednesday, September 26th

MORNING: 9.30. *Paper*: "The Application of Genetics to the Breeding of Farm Livestock," by Professor M. M. Cooper, Wye. Opener: Professor Wm. C. Miller, M.R.C.V.S., F.R.S.E.
12.0. Last meeting of Council 1950/51.

AFTERNOON: 2.30. Congress Photograph.
3.0. Annual General Meeting.

EVENING: 7.30 for 8.0. Annual Banquet, at the Grand Hotel.

Thursday, September 27th

MORNING: 9.30. *Paper*: "The Natural History of Canine Viral Hepatitis," by Mr. H. B. Parry, B.A., M.R.C.V.S., and Dr. N. M. Larin. Opener: Professor L. P. Pugh, B.SC., F.R.C.V.S.

AFTERNOON: Free for Golf, Tennis, etc.

EVENING: 8.30. Ladies' Guild Dance, at the Grand Hotel, Eastbourne.

Friday, September 28th

MORNING: 9.30. *Paper*: "Parasitic Broncho-pneumonia in Cattle," by Dr. E. L. Taylor, M.R.C.V.S., D.V.H., of Weybridge. Opener: Mr. J. W. Bruford, M.R.C.V.S.

AFTERNOON: 2.30. Large-animal Surgery Demonstrations at the Wellcome Veterinary Research Station, Frant, Nr. Tunbridge Wells.

1. Films—shown by Mr. J. McLintock, M.R.C.V.S.
2. Rumenotomy—by Mr. K. Stuart, M.R.C.V.S.
3. Dishorning—various methods to be demonstrated.
4. Demonstration of Certain Methods for the Evaluation of Bull Semen—by Mr. J. L. Hancock, M.V.SC., M.R.C.V.S.

Ladies also invited to visit Frant, where special arrangements will be made for their entertainment.

EVENING: Dance given by the Grand Hotel.

Saturday, September 29th

MORNING: 10.0. Closing Meeting of the Congress, followed by
First Meeting of 1951/52 Council, N.V.M.A.